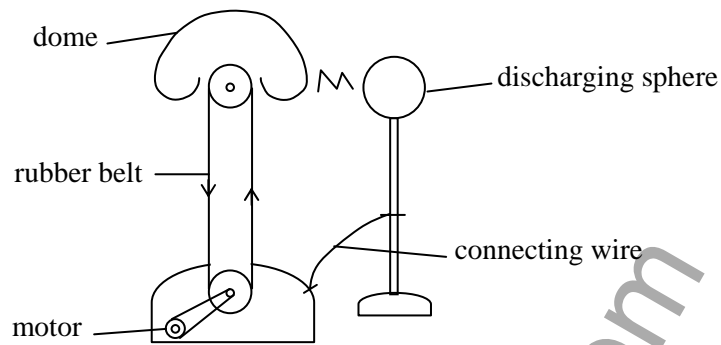


(a) The diagram shows a Van de Graaff generator, which is designed to produce large charges.



Explain how the charge is built up on the dome.

.....

.....

.....

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..... [5]

(b) An earthed metal sphere is brought near to the dome.

(i) Describe what you would see.

..... [1]

(ii) How can you explain this ?

.....

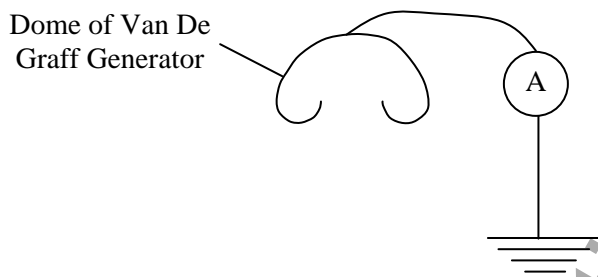
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..... [2]

(a) What is the difference between static and current electricity ?

.....  
.....  
..... [2]

(b) A Van de Graaff generator is given a negative charge. The dome is connected to earth via a sensitive ammeter.



(i) What would you expect to see on the ammeter ?

..... [1]

(ii) Explain your answer.

.....  
.....  
..... [3]

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(a) On a warm, dry day, you may get an electric shock when you slide out of a car seat and then touch the bodywork of the car.  
Explain why this happens.

.....  
.....  
.....  
..... [3]

(b) If you hold onto the bodywork of the car as you slide out, you do not get a shock.  
Explain why not.

.....  
.....  
..... [2]

(c) Why are you more likely to notice this on a warm, dry day?

.....  
.....  
..... [2]

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(a) Give one way in which static electricity is useful.

..... [1]

(b) Explain how static electricity is used in photocopying.

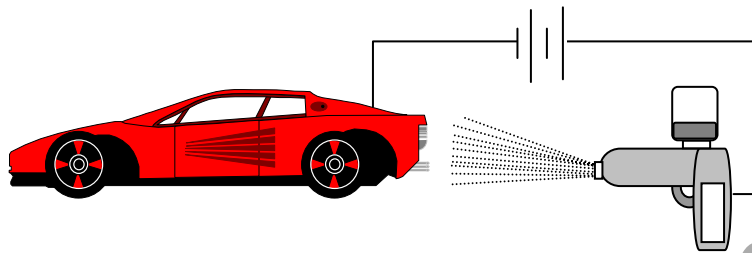
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..... [2]

(c) Describe one way in which static electricity is a nuisance (or may be dangerous).

.....  
.....  
.....  
.....  
.....  
..... [3]

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(a) Static electricity can be used in the spray painting of car bodies.



On the diagram, show the charges on the spray-paint drops and on the car body. [2]

(b) Carefully explain the process.

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..... [5]

(c) Why should this spray painting be carried out in a dust-free atmosphere ?

.....

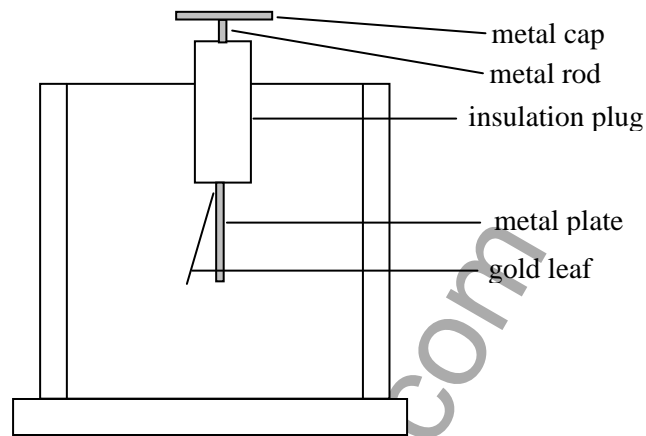
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..... [2]

High Demand Questions

QUESTIONSHEET 6

(a) A gold-leaf electroscope (shown below) consists of a metal rod, insulated from a case. On the rod is a flat, metal plate. A very thin piece of gold leaf is hinged to the bottom of the rod. The gold leaf is able to move.



When the electroscope is uncharged, there is an even distribution of positive and negative charges on the rod and plate.

A negatively charged rod is brought near the plate.

(i) What would you expect to see ?

..... [1]

(ii) Explain why you would expect to see this.

.....  
 .....  
 ..... [2]

(b) The same thing would happen if a positively charged rod was brought near to the plate. Explain why this would happen.

.....  
 .....  
 ..... [3]

(c) A rod that has a greater positive charge on it compared to the rod in (b) is brought near to the plate. What would you see happening this time ?

..... [1]

(a) A gold-leaf electroscope is given a negative charge.  
What happens to the gold leaf ?

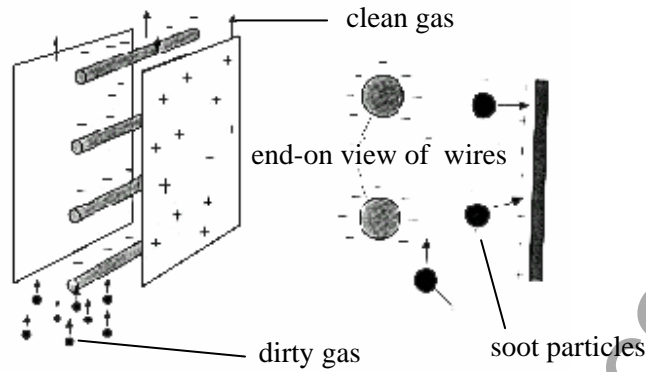
..... [1]

(b) Describe how you could use the charged electroscope to find out whether a rod has a positive or a negative charge, or no charge at all.  
Explain your answer.

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.....  
..... [5]

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(a) The diagram below shows an electrostatic smoke precipitator.



The wires carry a negative charge.  
What happens as the smoke passes near the wire?

..... [1]

(b) Why is the plate given a positive charge ?

..... [1]

(c) Describe the purpose of a smoke precipitator.

.....  
.....  
.....  
..... [4]

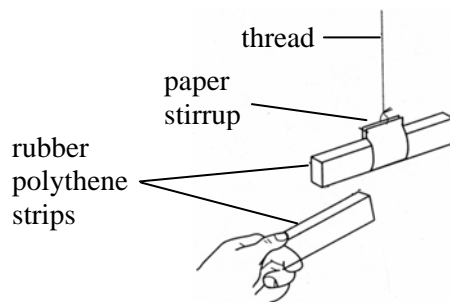
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- (a) A polythene rod can be given a negative charge.  
Explain how this is done.

.....  
 ..... [2]

- (b) A negatively charged polythene strip is freely suspended as shown.  
A second negatively charged polythene strip is brought near to it.



- (i) Describe and explain what happens.

.....  
 ..... [2]

- (ii) The second strip is replaced by a positively charged one.  
Describe and explain what happens.

.....  
 ..... [2]

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(a) What is meant by “static” electricity ?

.....  
.....  
..... [2]

(b) An acetate rod is given a positive charge when it is rubbed with a cloth.  
Use ideas about movement of charge to explain why this happens.  
Include a diagram with your answer.

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.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

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(a) Manjinder combs his hair with a plastic comb. He then brings the comb near to some tiny pieces of tissue paper.

(i) Describe what happens.

..... [1]

(ii) Explain in detail why this happens.

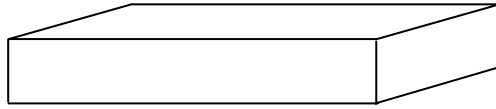
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.....  
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.....  
..... [5]

(b) If you rub a balloon on your jumper, it can be made to stick to a wall. After some time it will fall down. Explain why this happens.

.....  
..... [1]

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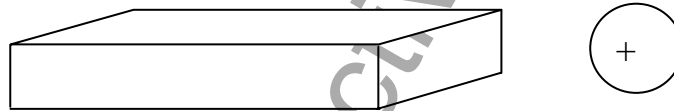
- (a) An electrical conductor allows the movement of charge.  
The diagram shows an electrical conductor in the shape of a bar.



On the diagram, draw the pattern of positive and negative charges you would expect to find. [2]

- (b) A positively charged body is brought near to the conductor.

(i) Draw in the new pattern of charges on the conductor. [2]



(ii) Explain why you have drawn this pattern.

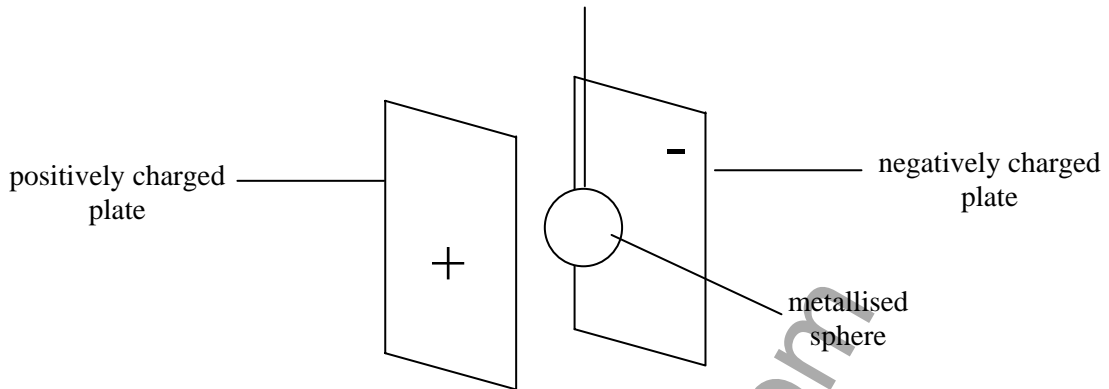
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..... [2]

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The diagram shows a light, conducting sphere, suspended by a cotton thread. It is able to swing freely between the two charged metal plates.



When the sphere is brought into contact with the left-hand plate, it is given a positive charge. The sphere is then allowed to swing freely.

(a) Describe what happens.

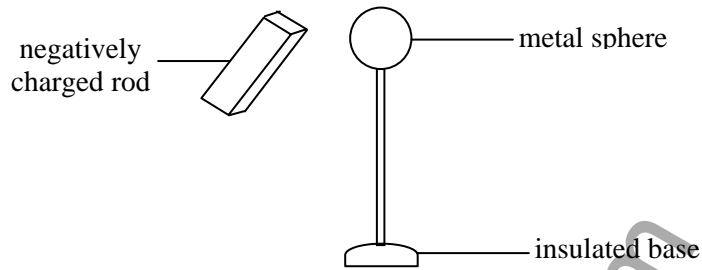
.....  
..... [2]

(b) Why does the sphere behave like this ?

.....  
.....  
.....  
..... [4]

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(a) A metal sphere is mounted on an insulated base as shown below.



A negatively charged rod is brought near to it.  
Explain what happens.

..... [3]

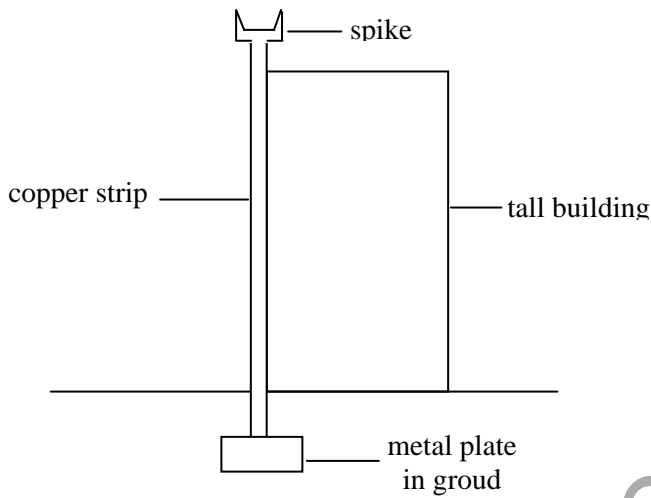
(b) The sphere is now connected to earth.  
Explain what happens.

..... [2]

(c) The rod used in the experiment is an insulator, whilst the sphere is a conductor.  
Explain the difference between an insulator and a conductor.

..... [2]

- (a) A lightning conductor, (see below) is attached to a tall building and connected to earth.  
In a storm, the electrical charges in clouds separate. The negative charges build up at the base of the cloud.



Draw the charges that build up at the top of the lightning conductor. [2]

- (b) Describe how the lightning conductor protects the building from being struck by lightning.

.....

.....

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..... [4]

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A girl with long, fine hair stands on a rubber mat and puts her hand on the dome of a Van de Graaff generator. The generator is started.

(a)(i) What happens to the girl's hair ?

..... [1]

(ii) Explain why this happens.

..... [2]

(b)(i) What would happen if the girl repeats the experiment, but this time stands on a metal plate ?

..... [1]

(ii) Explain your answer.

..... [2]

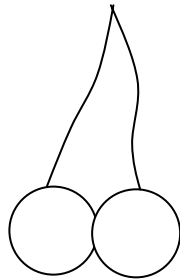
(c) State **two** other ways in which the effect on the girl's hair could be prevented.

..... [2]

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Two light, conducting balls are suspended on nylon threads of equal length.



Describe and explain what would happen to balls in each of the following circumstances:

(a) the balls are equally charged and both carry the same charge.

.....  
..... [2]

(b) the balls are equally charged with opposite charges.

.....  
.....

(c) one ball is charged and the other is not

.....  
..... [2]

(d) the balls have like charges, but do not carry equal charges.

.....  
..... [2]

(e) neither ball is charged

.....  
..... [2]

Give reason for each of the following:

(a) staff in operating theatres must not wear clothing containing nylon.

.....  
.....  
..... [2]

(b) sometimes skirts dried in a tumble-drier may stick to the wearer's legs.

.....  
.....  
..... [2]

(c) mobile phones should not be used in petrol stations.

.....  
.....  
..... [2]

(d) people who work on the components inside a computer wear earthed bracelets.

.....  
.....  
..... [2]

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(a) steel cotton nylon paper copper perspex rubber carbon

From the list of materials given above, select:

(i) two good insulators

.....  
..... [2]

(ii) a material which is neither a good insulator nor a good conductor

..... [1]

(iii) two good conductors

.....  
..... [2]

(b) Glass, wood and the human body will all conduct electricity to some extent.  
What do they each contain that makes it possible for them to do this?

..... [1]

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Low Demand Questions

QUESTIONSHEET 20

Fill in the gaps in the following sentences

\_\_\_\_\_ a polythene rod gives it static electricity.

Static means not \_\_\_\_\_.

Atoms contain negatively charged particles called \_\_\_\_\_, \_\_\_\_\_ charged particles called protons and neutral particles called \_\_\_\_\_.

When charged objects are brought near each other, they either \_\_\_\_\_ or \_\_\_\_\_ each other.

What happens depends on their \_\_\_\_\_.

Two objects with the \_\_\_\_\_ charge will \_\_\_\_\_ each other, whilst oppositely charged objects will \_\_\_\_\_ each other.

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